ETHIOPIAN INTERNATIONAL JOURNAL OF MULTIDISCIPLINARY RESEARCH

eISSN: 2349-5715 pISSN: 2349-5707

Volume: 11, Issue 01, Jan-2024 SJIF 2019: 4.702 2020: 4.737 2021: 5.071 2022: 4.919 2023: 6.980

RADIATION DIAGNOSTICS IN MAMMOLOGY

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Abstract: Breast cancer is the most common cancer in females worldwide, accounting for nearly one-fourth of newly diagnosed cancers in Fergana Valley. Nearly half of women in Fergana valley develop breast cancer at the age of 50 years versus the age of 65 years . In developing countries, a large number of women are still diagnosed at a later stage in comparison to developed countries where early detection is made through organized screening programs. The number of breast cancer cases in Asia has increased with higher rates in the Eastern region (26.6 out of 100 000 women) compared with other regions. Nearly one-third of women develop breast cancer younger than the age of 50 years. Various studies have highlighted risk factors that could be related to the increase in breast cancer incidence in Central Asia. Screening with mammography for breast cancer detection has already become the standard community practice in many countries. Other imaging modalities that can be helpful diagnostic tools (like ultrasound or magnetic resonance imaging) are not feasible for general screening purposes due to inherent limitations (operator dependency and lack of recognizing microcalcifications with ultrasound, claustrophobia and contrast-related concerns with MRI) and cost (especially with MRI).We aim to highlight various causes of missed screening-detected incident breast cancers (i.e., cancers diagnosed on a second or subsequent screen in women after initial or baseline negative studies), and to emphasize measures that could overcome weaknesses in the chain of events.

Key words: Breast cancer, mammograms, MRI, screening, biopsy.

We retrospectively reviewed data of Fergana valley women who came to our radiology department in Andijan for screening mammograms in a period of three years. The screening population included asymptomatic women who either voluntarily requested screening (i.e., self-referrals), or were referred by clinicians for screening through outpatient clinics in the specified period. Symptomatic women (with palpable nodule or mass) requiring diagnostic mammograms or BI-RADS categories >2 at screening, women with a prior breast biopsy or intervention (excision, lumpectomy, mammoplasty) cases, interval breast cancers (cancers detected during inter-screening period or before the next scheduled screen), lapsed attenders (women who did not appear on any subsequent screening) were excluded. All clinical and radiologic information were kept strictly confidential[1]. Clinical information and radiographic/imaging findings were acquired through patient clinical notes, hospital information systems, radiology information systems, or picture archiving and communication systems. As the study was retrospective and did not involve disclosure of any patient information and privacy, the ethics committee of our hospital waived the need for patient consent. A literature review was performed through electronic search (Google Scholar, PubMed). Screening mammogram was defined as a mammogram that was acquired in an asymptomatic woman (i.e., with no palpable nodule, lump, swelling or nipple discharge) aged 40 years or older. Regular or routine subsequent screening after an initial negative (BIRADS 1 and 2, Breast Imaging Reporting and Data System) study was performed in our department on yearly (annual) basis. Screening in women younger than 40 years was also offered in cases of strong family history of breast cancer (i.e., mother or first-degree relative with breast cancer).

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If screening reduces breast cancer mortality by 15%, 1 out of 2000 women would be saved over 10 years. Effective breast cancer screening can detect non-advanced or early stage cancer[2]. An increase in the incidence of true (occult) breast cancer has been observed in the transition from film screen to digital mammography[3]. Although our study was of a small scale and short duration, we discovered some important findings. We observed relatively higher percentages of both incident (15 cases, 1.6%) and missed (7 out of 15, 46%) breast cancers in our study. Hoff et al found a 0.24% cancer detection rate on screening with digital mammography and a 20% missed rate[4]. We feel that this variability in percentage outcomes might be related to various factors, like (I) screening was not organized, and did not involve general registered population, (II) screening was single-center hospital-based, perhaps catering to a certain population (III) lack of administrative structure for implementation, quality assurance, and monitoring purposes, (IV) cancer detection rates were not point-incident, but rather a cumulative percentage of detected cases in the second and third screen, (V) lack of familiarity with patient's level of awareness and perception, especially in cases of voluntary participation. These, along with regional variations and differences in the screened population (rural or urban, ethnicity), limit comparisons of our study with larger scale population-based organized screening programs. However, our screening-detected cancer rate was lower than in local data presented by Al Mulhim et al who observed a cancer detection rate of 5.3% (47 cancer patients out of 8061 women in 5 years) during screening in the Fergana Valey. Therefore, country-wise or region-based enrollment of women needs to be implemented, besides a central cancer registry and facilitation to ensure participation of candidates for any screening program. Coldman et reported that screening participants (of Canadian population) had 40% less breast cancer mortality than non-participants[5].Also, relatively smaller-sized tumors, less aggressive and node-negative disease were observed by Braun et al in a German screening program accounting for more breast conservation surgeries among the participants[6]. We therefore suggest that implementation of an organized screening program greatly affects timely diagnosis of breast cancer and its treatment at an early stage with better prognosis. Good communication between a radiologist, patient and her referring physician at the time of examination or after mammo-gram reporting can result in better compliance towards scheduled bookings. 'No-shows' can also be avoided by frequent reminder alerts (in the form of direct phone calls or mobile messages) by the appointment/booking officer one day prior to the scheduled dates. We tried to highlight three important 'components or links' in the chain of any breast cancer screening program , namely the technician, patient and doctor (physician, radiologist). A detailed clinical examination, identification of high-risk patients (i.e., those with a family history of breast cancer) and timely referral for an imaging (either for an ultrasound or mammography based on age and condition of patient) by the physician, adequately acquired and quality mammograms by a trained technician, quality assessment and proper standardized reporting by a radiologist, and clear understanding, compliance to regular imaging follow-up and recommendation by the patient, all contribute towards an effective screening program. Onega et al highlighted a similar concept and labelled them as key domains influencing process and outcome measures[7].Unfortunately to date, there is neither a nation-wide breast cancer screening program nor a breast cancer registry (database for all the regions) available in Saudi Arabia, though breast cancer awareness campaigns and local hospital-based or personalized screening programs are in progress. We strongly suggest that at places where mammography services are available and screening is offered, at least a hospital-based cancer registry and data services should be maintained even if the hospital is not an oncologic center.

The limitations in our study included a retrospective, small sample-sized, single center, and short duration study. We also considered the limited availability of dedicated mammo-technicians and breast radiologists (in whole year), a deficient double reporting of the mammograms, unavailability

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of computer-aided detection and even the absence of an oncologic department as factors contributing towards such missed breast cancers. Also, we noticed lapses in communication and deficiencies in patient data and reminder alerts/recall system for the women also partly contributed towards delays in patient compliance towards imaging and recommendations. Therefore, it will be wise to consider radiologic surveillance of as a benchmark for assessing the effectiveness of any breast cancer screening program, by which limitations or deficiencies can be identified and fixed. Improved screening facilities, quality mammographic acquisition and interpretation, double reading, and implementation of an organized screening program may help to avoid missed breast cancers.

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